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Recherches sur les Instruments, les Méthodes, et le Dessin Topographiques, par le Colonel A. Laussedat, Membre de l'Institut, Directeur du Conservatoire national des Arts et Métiers. 2 volumes, 891 pp., 44 pl. Paris, Gauthier-Villars, Imprimeur-Libraire.

The first volume of this memorable work sums up the extent of the world's knowledge concerning the instruments and methods of topography, by portraying the whole course of the evolution of modern appliances from the simple apparatus and equally simple practices in times of remote antiquity of the surveyors of Arabia and Egypt, in whose methods are found the germs which have developed in the intervening ages into the methods of the present day.

The author has characterized his work with erudition and research, and has presented it with grace and precision, touching upon the allied subject of the evolution of the instruments and methods of astronomy as far as their influence upon topography and geodesy has been important, and bringing out with striking distinction the immense influence of the application of such inventions as the telescope and the vernier in the construction of topographical instruments. Progress for 2,000 years has been marked, not by any great discovery in the geometrical conceptions which prescribe the kinds of measurements that are required in topographical work, but by the improvement of the means that have been applied to effect these necessary measurements in the field. The numerous figures which accompany the historical and explanatory text add greatly to the effect of that part of the plan of the work, which aims to convey a knowledge of the construction of the existing instruments for topographical measurements, and of their dependence upon and connection with those which have been formerly employed but have now passed into disuse.

Following this excellent account concerning instruments and surveying is an equally commendable exposition of the stages through which the art of topographical drawing has passed since the time when drawings were mere pictorial imitations, such as are found in hieroglyphics and seen in the vestiges of sculpture chiselled in rocks that have resisted the action of the elements. This kind of drawing became more and more expressive in the course of centuries, as may be seen in the paintings, the mosaics, and the bronze medals of ancient times, and in the manuscripts, the sculptured ivory, the bas-reliefs in bronze and marble, and the tapestries of the Middle Ages; but it was not until the sixteenth century that artists taxed themselves by observing the rules of perspective. In Greece

and Rome the land surveyors began in the early centuries of the Christian era to use the plan as a means of representation, and there grew up in succeeding centuries a combination of the plan and the perspective by which important features embraced within a general plan would be represented by pictorial drawings. In fact, the art of topographical representation, as it is now recognized, remained in eclipse until quite recent times. At the period of the Renaissance pictorial topography still prevailed, and in nearly the same condition in which it was practised in ancient times. In the time of Mercator, geographers still sought to give an agreeable aspect to their maps, as far as the scale would permit, by representing the relief of the terrain by a series of forms drawn in perspective and rebatted from south to north on the face of the chart. It was not until after the middle of the eighteenth century that maps began to be constructed exclusively on geometrical principles. The relief of the terrain was generally represented in these maps by hachures, producing varying tones to represent the changing slopes of the surface forms and opening up a vast field of artistic development to the scientific topographer. Contour lines of equal level were first employed in hydrographic charts by the Dutch and French engineers, and, as levelling instruments became more perfect, the advantages of this mode of representing the relief features in maps came to be generally recognized—among engineers on account of its benefit in projecting engineering works, and among geographers because it has rid their productions of the illusions and false ideas that formerly prevailed in maps, concerning the forms and heights of the topographical features.

Having shown in the history of the development of the instruments and methods of topography that the ruling object has been the abridgment of operations in the field and the attainment of exactness and celerity in the direct measurement of distances and differences of level, the author proceeds, in a second volume divided into two parts, to unfold with masterful advocacy the applications of photography to the dominant aims of topographical and kindred measurements.

Colonel Laussedat has continued for many years to sustain his convictions of the utility of phototopographical methods, and his present work can be characterized as what might be expected from a man of keen scholarly mind, who, being thwarted in effecting the official adoption in his own country of methods which he believed to be capable of working important advances, has not ceased throughout his whole career eagerly to take in every important

idea and application touching the development of the theory that he had espoused, with the purpose of presenting at last a complete and convincing array of the evidences of the spreading adoption of the methods of metrophotography and phototopography and of the superiority of the results that have been achieved. The first part of this second volume, which in itself is a book of 184 pages, accompanied by 15 plates, is devoted to the theory of perspective and iconometry and of the camera lucida and the camera obscura, to the description and use of the instruments and apparatus employed in metrophotography and photography, and to the methods of utilizing photographic views in the preparation of maps and drawings. The treatment of the subject is made quite complete by including in the discussion not only these methods and instruments that are at present adopted for practical use, but also those that have been proposed and those that have been tried and set aside, and by exhibiting among the results the attainments in telemetrography by the military observatories during the siege of Paris by the Germans.

The second part, containing 271 pages and 18 plates, is devoted to an exposition of the development and progress of metrophotography in France, Germany, Italy, Austria, Canada, Switzerland, Spain, Russia, and Great Britain, by holding up to view the most characteristic original works in the languages of these various countries, and by pointing out the application of the principles which they recite, not only to topography but also to the sciences and the arts which have borrowed the assistance of photography and often derived unexpected advantages from it. G. W. L.

The Projection for the Map of the British Isles on a scale of 1/1,000,000, by Major C. F. Close, C.M.G., R.E. Published under the direction of Colonel D. A. Johnston, R.E., Director General of the Ordnance Survey. London: Printed for H. M. Stationery Office by Darling & Son, 1903.

Major Close's paper is the outgrowth of the advocacy on the part of the Sixth International Geographical Congress, assembled at London in 1895, of a map of the world on a scale of 1/1,000,000. In carrying out the portion of this project relating to Great Britain and Ireland, the British Ordnance Office found that the projections upon which the present Ordnance maps were constructed are such that the map to be produced could not be made by simple reduction from the existing ones, and, therefore, that such a projection might be adopted in the new construction as would be best suited